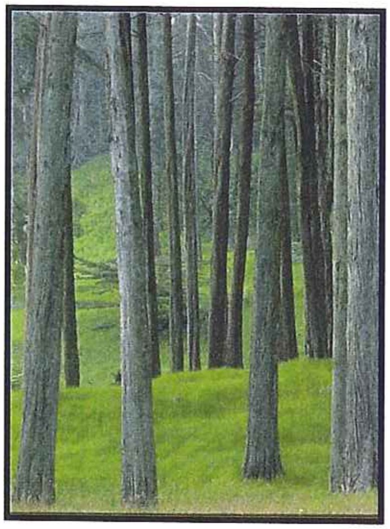
Vegetation Management Plan Pilot Project Update and Summary

May 2001



The Presidio of San Francisco offers some of the most spectacular landscape settings in the San Francisco Bay Area, if not the world. The Vegetation Management Plan for the Presidio of San Francisco (VMP) was developed to ensure that the Presidio's precious native habitats, beautiful views, stately historic forest, and orderly military gardens are preserved and enhanced. The VMP was formulated to guide the management of all native and introduced vegetation by the organizations operating within the Presidio.

The VMP Pilot Project Program, a collaborative program between the Presidio Trust and National Park Service, will test and establish effective forestry and habitat restoration techniques necessary to advance future VMP implementation strategies and actions. Small-scale projects (0.5-2 acres) will be implemented throughout the Presidio over the next five years, to create future "showcase" examples of anticipated long-term management practices.

Pilot Project #1 - Oak Survivorship Study

Pilot Project Goals

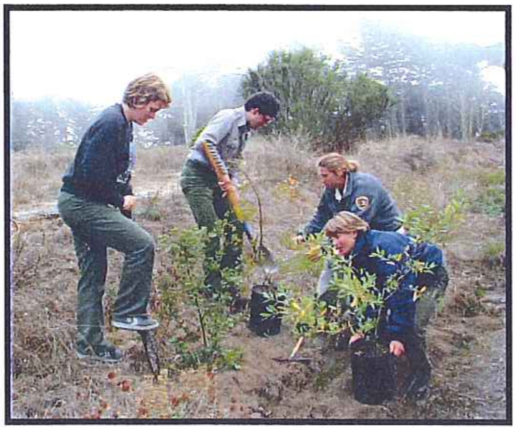
- Evaluate the long-term health and growth rates of 240 coast live oak trees, planted using various treatments.
- Test varying soil, nutrient and irrigation treatments to determine optimum environment for oak tree growth and survivorship.

Project Summary/Status

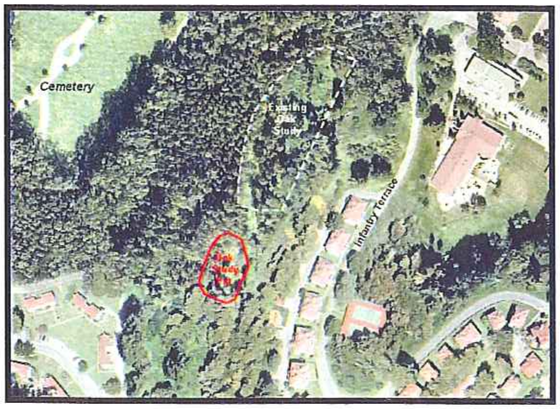
There are many areas within the Presidio's open space where coast live oak trees will be planted and restored under the Vegetation Management Plan. This pilot project was initiated to ensure that the best planting techniques and treatments are used in future restoration projects. Approximately 240 oak saplings and acorns were planted into research plots by staff and volunteers over the past two years within varying shaded and sunny environments. Plots have differing irrigation and soil amendment treatments, which will be evaluated over a five year period to determine what the optimum planting treatments are for future coast live oak restoration projects. Protective casings were installed around the acorn plantings to protect them from herbivory. Weeds are removed throughout the year by staff and volunteers to reduce competition during the early growth phase of the trees.

To date all saplings are alive, soil treatments do not appear to effect survivorship.

Irrigation has been installed to promote the establishment of these young oak trees.



Staff from the Presidio Trust, NPS, and Golden Gate National Parks Association coordinate volunteer planting efforts.



Planting plots are located near Infantry Terrace.

Implementation Timeline

2000

- Site Preparation
- Monitoring Plot Set Up
- First Phase Planting
- Irrigation Installation

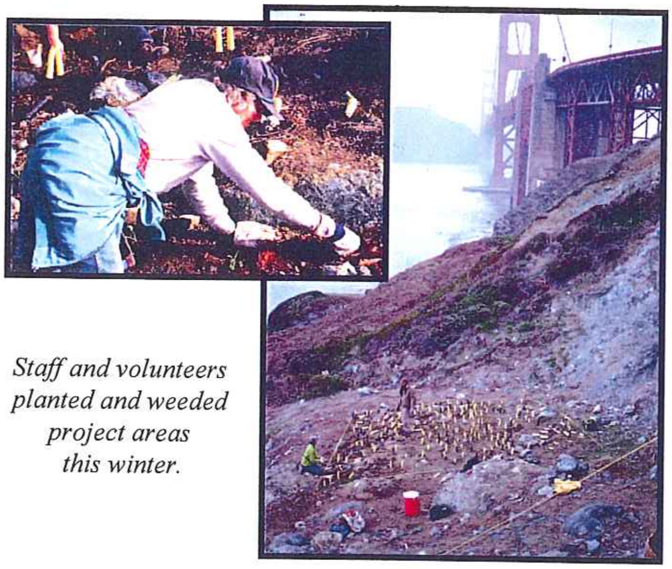
2001

- Second Phase Planting
- Irrigation Installation
- Weeding
- Monitoring

Pilot Project #2 - Serpentine Bluff

Project Goals

- Determine best restoration practices for restoring vegetation in serpentine soils, in preparation for the implementation of future environmental remediation activities.
- Evaluate the survivorship of serpentine species under varying soil and planting conditions.



Staff and volunteers planted and weeded project areas this winter.

Remnant native serpentine bluff scrub vegetation

Project Summary/Status

Much of the habitat restoration efforts completed on the Presidio have focused on sand dune restoration. However, during the next five years, it is anticipated that restoration activities and environmental remediation clean up efforts will expand into both the coastal and inland serpentine areas. This pilot project was initiated to ensure that the best restoration techniques are developed for future serpentine-based projects. Four small sub-sites located on the coastal bluffs, each with different habitat characteristics, comprise the setting for this pilot project. Restoration efforts began last year when nine Monterey pine trees were removed from below Battery Crosby. Trees were removed by using a crane to reduce impacts to the surrounding vegetation. Additional site preparation activities included the control and removal of large patches of weeds within other sub-sites near the Golden Gate Bridge and World War II Memorial. This winter approximately 4,000 native shrubs, herbaceous plants, wildflowers and grasses were planted and seeded within the project areas by staff and volunteers. Weeds are removed from February through August to reduce competition. Plants are monitored annually to evaluate the survivorship of each species. These and other stewardship activities will continue for the next five years. An additional seeding trial will take place next year to research the use of tacifiers and mulch in aiding the germination of seeds in seeding plots in areas of high wind exposure and steep slopes,.

To date, plants appear successful, with most species having flowered and set fruit. Additionally, many seeded annual species were also observed flowering within the plots.

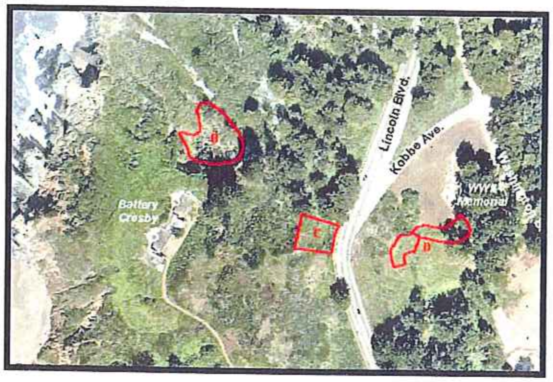
Implementation Timeline

2000

- Tree Removal
- Site Preparation - 3 areas
- First Phase Planting
- Monitoring Plot Set Up

2001

- Second Phase Planting
- Weeding
- Monitoring
- Planning for 4th area



Four sub-sites are located on the Presidio's western coastal bluffs, near both the WWII Memorial and Battery Crosby Road.

Pilot Project #3 - Eucalyptus Understory Diversification

Project Goals

- Determine if diversification of a eucalyptus forest understory is feasible
- Evaluate the structural diversity and survivorship of selected understory plant species - in a closed and open canopy habitats, and the associated wildlife values
- Test varying soil and irrigation treatments to determine optimum understory plant survivorship

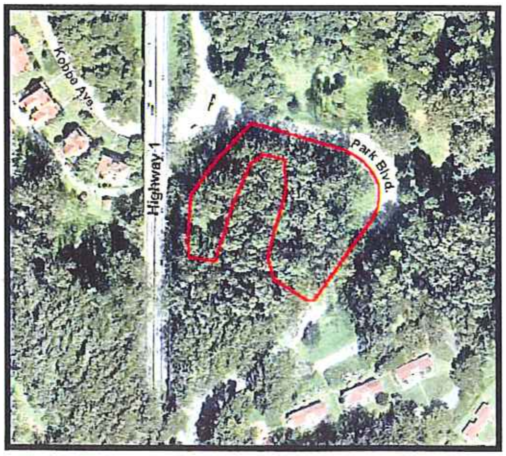
Irrigation was installed to enable the evaluation of varying irrigation and soil treatments.

Project Summary/Status

Approximately 70% of the Presidio's forest stands to be rehabilitated under the VMP are eucalyptus, and the majority of these grow on sandy soils. These eucalyptus stands vary in density, canopy cover, and understory vegetation growth. This pilot project was developed to better understand the feasibility of establishing a rich understory flora, and evaluate the potential corollary wildlife habitat values. This winter five eucalyptus trees were removed on the edge of the 2-acre project area to create an open canopy habitat environment within the forest stand. Staff and volunteers planted approximately 9,000 native trees, shrubs and ground cover species into areas of varying tree density and canopy openings. Irrigation was installed, and monitoring plots are in place to evaluate varying irrigation and site preparation treatments, as well as plant species survivorship and bird diversity. Hundreds of small flags are currently located within many of these plots, marking planting areas, These flags will be removed throughout the summer and replaced with less obtrusive markers. Weeds are removed from December to August for the next five years to reduce competition, and help young plantings establish.

Before (left) and After (below)

Removal of 5 trees created an open canopy area within the forest stand.



Pilot Project is located in the stand of eucalyptus south of Kobbe Avenue, east of Highway 1 and west of Park Blvd.

Implementation Timeline

2000

- Tree Removal
- Site Preparation
- First Phase Planting
- Monitoring Plot Set Up

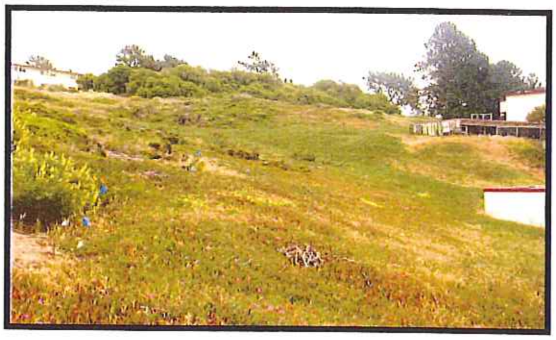
2001

- Second Phase Planting
- Irrigation Installation
- Weeding
- Monitoring

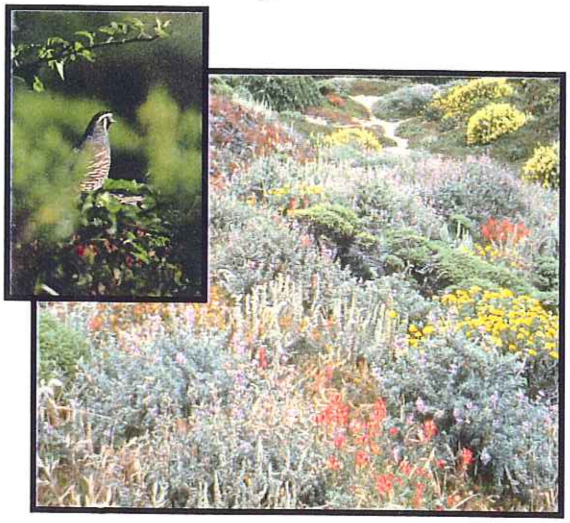
Pilot Project #4 - Feral Dunes Remnant Scrub

Project Goals

- Determine best management practices necessary to convert disturbed area to dune habitat
- Expand natural corridor for sensitive or endangered species habitat - including San Francisco lessingia, California Quail



The Remnant Scrub Pilot Project Site -- looking southeast



Dune Scrub Habitat

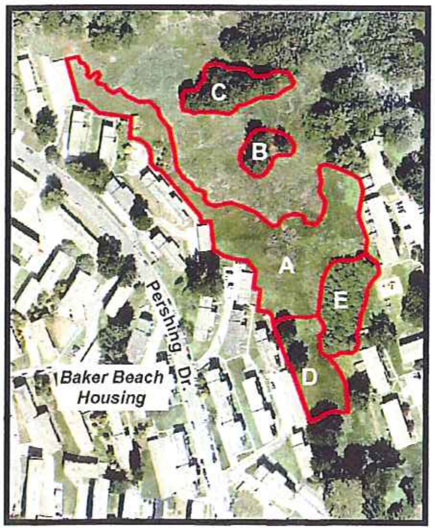
Implementation Timeline

- Phase one project implementation:
- Tree and Non-native Plant Removal
- Sand importation
- Irrigation Installation
- Planting

Project Summary/Status

The Feral Dunes Remnant Scrub project (Remnant Scrub) is an alternative project site to the previously presented Graded Area 9 VMP Pilot Project. Recent delays with the Graded Area 9 project have triggered the implementation of the Remnant Scrub project. Remnant Scrub is part of an existing habitat restoration site, and the current vegetation is mostly intact dune scrub vegetation with areas dominated by iceplant, non-native trees, and other invasive non-native plants. The Remnant Scrub project area consists of five sub-sites. The removal of the invasive non-native plant species within these sub-sites will be phased over two years (approximately 1 acre of iceplant, 14 Monterey pine trees and several small patches of Cape ivy to be removed in 2001, and a stand of myoporum to be removed in 2002). Approximately 3,000 cubic yards of sand will be placed over the northern project area to reduce the weed seedbank and promote the establishment of dune plants. More than 10,000 Presidio-grown native trees, shrubs and wildflowers will be used to revegetate the project area. Temporary irrigation will ensure that young plants are well established. Weeding, monitoring and other natural resources stewardship activities will continue for the next 5 years.

Neighborhood meetings will occur, and public education materials disseminated prior to project implementation The project is anticipated to begin early this fall.



All sub-sites of the Remnant Scrub Pilot Project are northeast of Baker Beach Housing and southwest of Washington Blvd.

Pilot Project #5 - Mountain Lake Enhancement Plan - Phase 1

Project Goals

- Convert the existing exotic woodland to a native woodland habitat, increasing habitat value and eliminating the negative impacts associated with the eucalyptus at Mountain Lake.
- Improve the health of existing riparian woodland by eliminating invasive exotic weeds and revegetating the understory with a diversity of appropriate native shrubs and groundcover.

Project Summary/Status

This pilot project builds upon the approved actions of the Mountain Lake Enhancement Plan, by ensuring that the proposed restoration and revegetation techniques used are evaluated and studied for future riparian restoration efforts. The pilot project involves the removal of 94 eucalyptus trees along the eastern shore of Mountain Lake; revegetation of the tree removal site with a mix of native wetland, arroyo willow woodland and oak woodland species. Revegetation would also include the reintroduction of a number of native species to the site. Tree removal efforts would occur in the late summer, followed by weed removal efforts which would include the containment of approximately one-acre of Cape ivy found in the existing riparian woodland, and the removal of other understory non-native plants. Newly planted trees, shrubs and wetland species would be monitored annually to evaluate the survivorship of each species. Maintenance and stewardship activities will continue for the next 5 years.

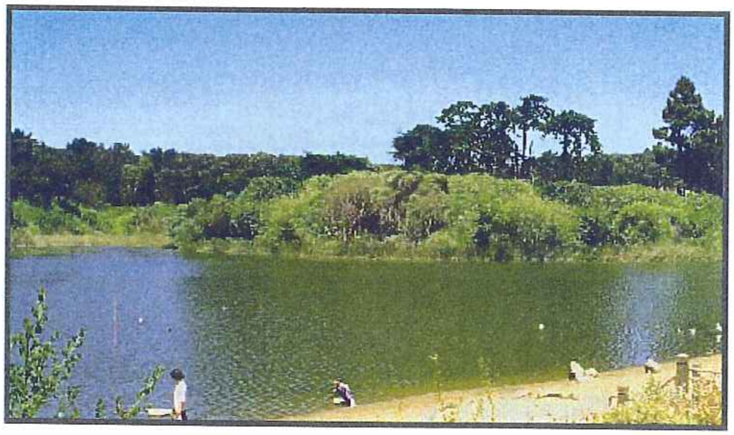
Revegetation would include trees and shrubs found with a riparian oak woodland community

Implementation Timeline

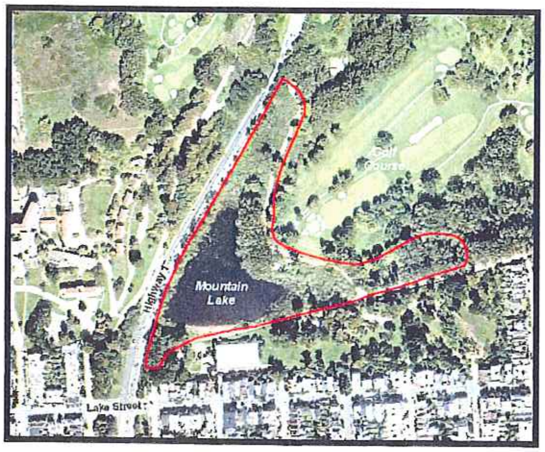
2001

- Planning Completed
- Plant Propagation
- Tree Removal
- Site preparation
- Revegetation

Eucalyptus trees on the eastern shore of Mountain Lake



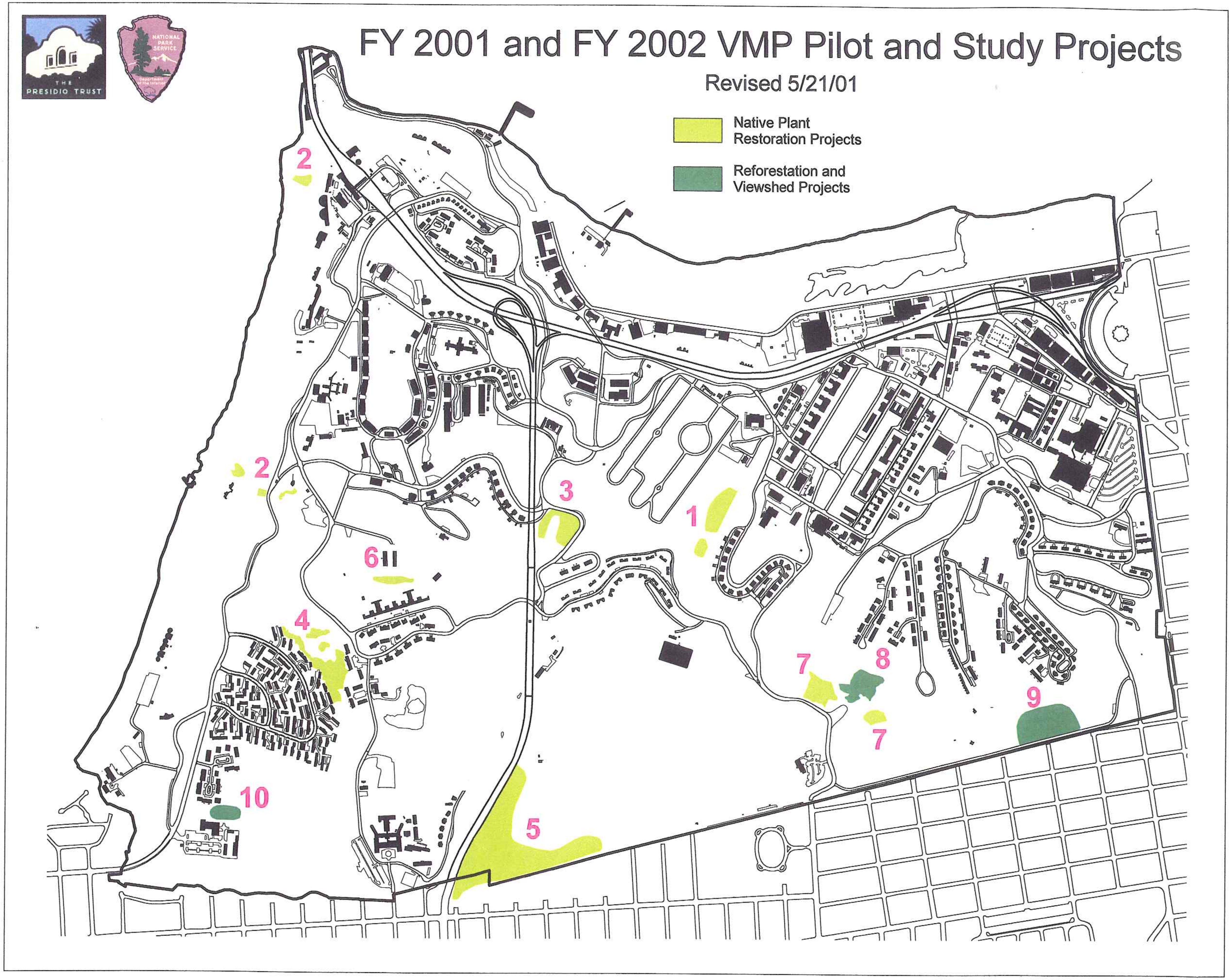
Photosimulation depicting anticipated changes to the vegetation community after the removal of the Eucalyptus trees - approx. 20 years later



Pilot project located on east shore of Mountain Lake

FY 2001 and FY 2002 VMP Pilot and Study Projects

Revised 5/21/01


THE PRESIDIO TRUST
NATIONAL PARK SERVICE
🟩 Native Plant Restoration Projects
🟩 Reforestation and Viewshed Projects
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Pilot Project Legend:

1. Oak Survivorship Study
2. Serpentine Bluff
3. Eucalyptus Understory Diversification
4. Feral Dunes Remnant Scrub
5. Mountain Lake Enhancement Plan - Phase 1
6. Rob Hill Eucalyptus Conversion
7. Inspiration Point Rare Plant Enhancement
8. Inspiration Point Viewshed Enhancement
9. Restoration of Forest Health
10. Reforestation

Pilot Project #6 -- Rob Hill Eucalyptus Conversion

Project Goals

- Determine best and most sensitive restoration practices for converting eucalyptus forest to an dune scrub vegetation community
- Test and evaluate public resource education strategies

Project Summary/Status

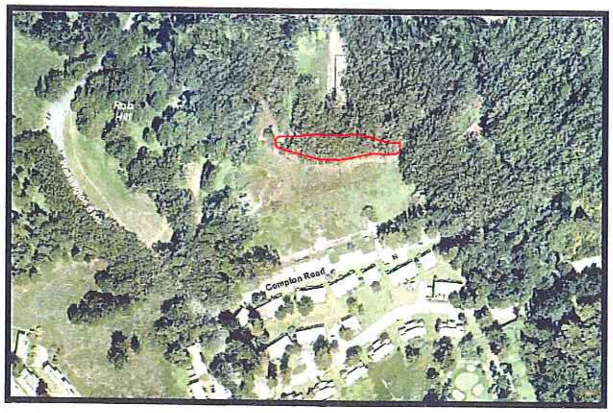
Eucalyptus is the dominant and fastest spreading tree in the Presidio forest. This pilot project will evaluate the effectiveness of removal and control techniques for this species in sandy soils, as well as treatments necessary to re-establish native dune trees, shrubs, herbaceous plants and wildflowers (the planting plan will be determined through future planning) in areas once dominated by eucalyptus. The project involves the removal of approximately 90 eucalyptus trees from above Battery McKinnon Stottsenberg. This stand of eucalyptus is directly adjacent to one of only six remaining populations of the federally endangered San Francisco lessingia. Initial planning efforts for this project are underway, and in will be completed in coordination with the larger Presidio wind study findings, once completed. Tree removal activities could occur as early as August 2002. Additional weed removal activities would follow, including the control of invasive ivies currently growing within the eucalyptus understory. The surface and ground hydrology will be monitored in 2001 to determine whether or not sand would be placed on the project area after tree removal is complete. Several thousand of dune wildflowers, shrubs and trees will be used to revegetate the project area. Temporary irrigation would occur until the plants are well established. Weeding, monitoring and other natural resources stewardship activities will continue for the next 5 years.

Implementation Timeline 2001

- Complete planning
- Develop photosimulation
- Coordinate with wind break study
- Plant Propagation

Eucalyptus trees located north of Battery McKinnon Stottsenberg

Dune scrub vegetation located north of the Public Health Services Hospital. Similar vegetation would replace the eucalyptus trees



The pilot project encompasses the eucalyptus stand north of Battery McKinnon Stottsenberg, and south of the Central Magazine and Bay Area Ridge Trail

Pilot Project #7 -- Inspiration Point Rare Plant Enhancement

Project Goals

- Test and evaluate landscape level restoration techniques for rare grassland communities
- Expand natural corridor for sensitive or endangered species habitat - including Presidio clarkia and other unique serpentine endemics.

Project Summary/Status

As indicated in the summary text for pilot project #2, most of the past restoration efforts on the Presidio have focussed on dune habitats. Of the restoration activities that have occurred on serpentine soils, most were focussed at Inspiration Point. The purpose of this pilot project is to build upon those efforts, and continue habitat enhancement for the federally endangered Presidio clarkia population, as well as create environmental conditions favorable for the reintroduction of the federally threatened Marin dwarf flax. Pilot project activities will examine effective landscape-level methods to eliminate and/or control the primary threats to these rare species and the serpentine grassland community that supports them: competition from non-native grasses. To accomplish this, two pilot sites have been identified within the protected grassland habitats at Inspiration Point. The method to be tested in the eastern grassland for control of annual exotic grasses would be a small-scale prescribed fire (less that .5 acres), a method for removing accumulated vegetation build up (litter). The accumulation of litter has been shown in scientific studies to increase the spread of exotic annual weeds to the detriment of native species. The methods to be tested in the western grassland for controlling both annual and perennial exotic grasses would be small-scale burning followed by hand removal and/or spot herbicide application. Approximately 47 non-historic pine trees would also be removed. Both sites would be seeded or planted with native grasses, wildflowers and other herbaceous plants in 2003-04. These projects would be done in coordination with local academic institutions, including U.C. Berkeley, Stanford and San Francisco State University. A publication would be developed and provided to interested visitors and community members regarding this project and pilot project #8. A staff member would also be on-site both prior to, and during all tree removal, heavy equipment and burning activities, so as to address public concerns and questions. Trail access and circulation would be modified during the project and a brochure would be available to local users outlining alternative trail routes, as well as posting trail closures.

Serpentine Grassland Habitat

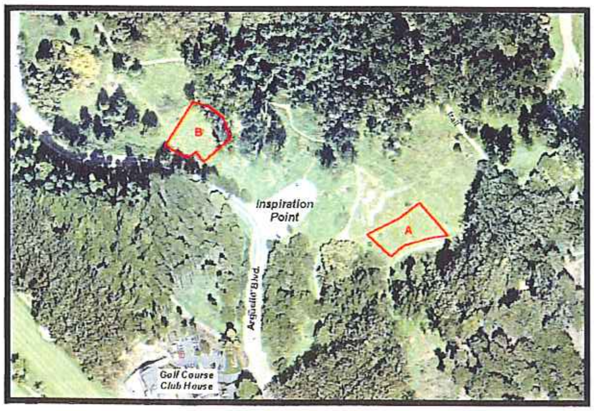
Presidio Clarkia

San Francisco Owls Clover

Implementation Timeline 2001(Tentative)

- Planning Completed
- Plant Propagation
- Tree Removal (partial)
- Site preparation
- Small-scale burn or flaming

**Tree removal and burn could shift to 2002



The two pilot project sub-sites are located within the grassland habitats east and northwest of the Inspiration Point overlook

Pilot Project #8 -- Inspiration Point Viewshed Enhancement

Project Goals

- Re-establish historic viewshed corridor
- Expand natural corridor for sensitive or endangered species habitat- including Presidio clarkia and other unique serpentine endemics

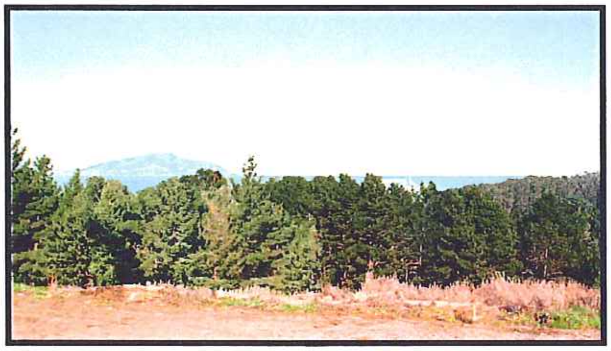
Project Summary/Status

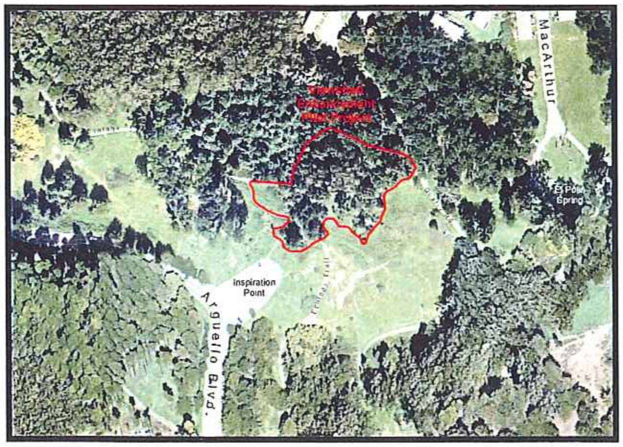
The Vegetation Management Plan identifies historic viewpoints and vistas on the Presidio requiring restoration. This pilot project focuses on the restoration of the historic view of San Francisco Bay , Alcatraz and Angel Island from the Inspiration Point overlook. Approximately 2 acres (117) of non-historic trees will be removed from a north-facing slope below the Inspiration Point parking area that are currently obscuring the view. The area is a designated natural area in the Vegetation Management Plan, therefore the project also has two additional purposes: to restore the afforested area to a native plant community of the highest possible ecological value, and to evaluate the methods and feasibility used to accomplish these objectives. A computer –based model was used to evaluate data about the surrounding tree heights and locations to determine the number of trees to be removed.

The viewshed enhancement project area will be revegetated with more than ten thousand native grasses, shrubs and trees over a period of two years. Revegetation will also include the establishment of the both the federally endangered Presidio clarkia and federally threatened Marin dwarf flax. Weed removal removal efforts will occur in two phases. Initially understory weeds will be removed and burned to prepare the site for revegetation, and. Weeding, monitoring and other natural resources stewardship activities will continue for the next 5 years.

Above: Pilot project area (looking north)

Below: Photosimulation of viewshed restoration





The pilot project includes the eucalyptus and pine forest stand north of the Inspiration Point overlook.

Implementation Timeline: 2001

- Planning Completed
- Plant Propagation
- Tree Removal
- Site preparation
- First Phase Revegetation

**Site preparation may include small-scale burning activities

Pilot Project #9 -- Restoration of Forest Health

Project Goals

- Improve forest health by changing the current tree species. Trees in present forest are in poor condition due to poor pruning practices.
- Reduce long-term investment in maintenance of trees by changing species to another tree type.

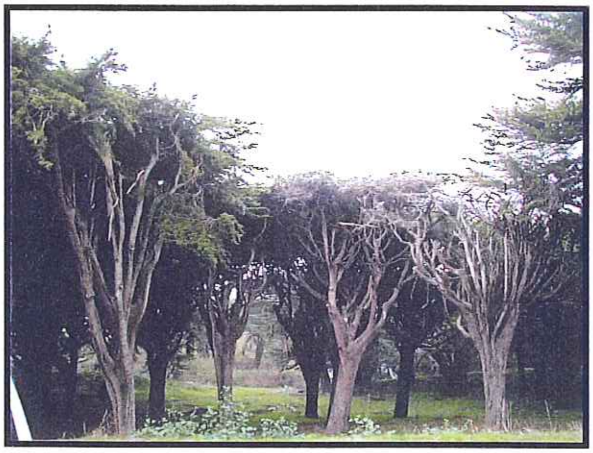
Project Summary/Status

The Presidio's forest is one of the park's most significant character-defining features. However, many trees have reached an advanced stage requiring rehabilitation to counteract the effects of old age, and anticipated natural storm events. In several areas, species that were historically planted may require substitution with other species to reduce potential impacts from pests or to achieve a different desired form and appearance. The Monterey cypress trees within the "Pygmy forest" have been topped to reduce tree heights for many years, as a result, the trees in this area incurr high incidences of limb breakage, are now flat-topped, intertwined with irregular side branch growth, and unnatural in appearance.

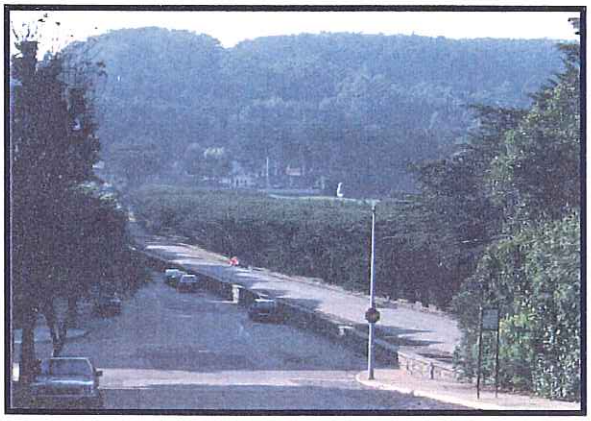
This small-scale pilot project will test both feasibility, and methodologies for substituting for historically planted species. The project will also increase forest health by implementing reforestation activities within small openings already present within the degraded pygmy forest, as well as replacing small numbers of trees in the approximately 1/3 acre opening. Planning for this project will occur in coordination with the findings of the Historic Forest Characterization Study (see back page). The replacement tree species is yet to be fully determined, currently coast live oak trees are being considered. Once a tree replacement species is determined, and stock of proper genotype and size are obtained, planting would begin as early as winter 2001. Tree removal (within the degraded forest) will only be undertaken if a replacement species is obtained, and would begin as early as late summer. A weeding, maintenance and monitoring program will be developed to ensure the establishment of the young saplings. Additionally, temporary irrigation would be installed.

Implementation Timeline 2001

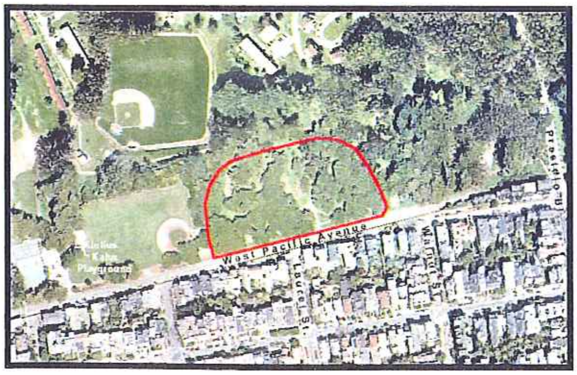
- Planning completed
- Tree Removal - see text above
- Site preparation
- Reforestation



Monterey cypress trees within the Pygmy forest have been improperly pruned for many years, resulting in degraded forest conditions.



The "pygmy" cypress forest is west of the Presidio gate and north of Pacific Avenue. The pilot project area is noted in red below.



Pilot Project #10 -- Reforestation

Project Goals

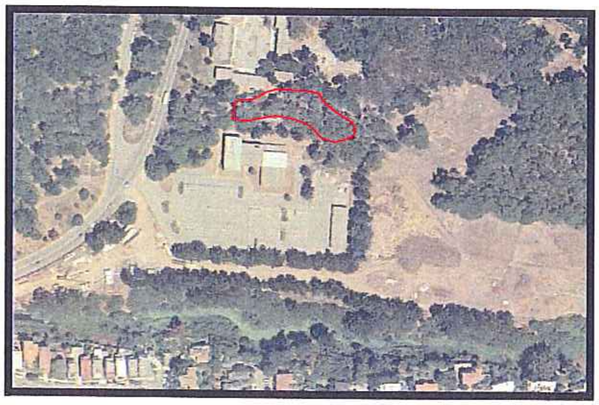
- Determine best management practices and resource needs to establish Monterey cypress seedlings in sand
- Monitor reforestation survivorship of Monterey Cypress plantings
- Verify anticipated tree growth rate of 30 feet over 10-15 year period

Above: Pilot project site
Left: Monterey cypress Seedlings

Project Summary/Status

Rehabilitation of the Presidio's forest is necessary to ensure its long-term health. Multiple concepts for rehabilitation are presented in the VMP, and will be further evaluated and refined by the Historic Forest Characterization Study (see back page). This pilot project will evaluate one concept for rehabilitation -- managing for a range of ages, by removing small areas of dead and dying trees, and replacing them with the same species.

Planning for this project will occur in coordination with the findings of the Historic Forest Characterization Study. Trees would be replaced with locally-grown Monterey cypress saplings, as they are the most suitable as a windbreak species. Saplings would be planted from either one gallon or two gallon tree pot sizes. Tree removal would begin as early as late summer, and would only be undertaken if reforestation activities would follow in the late fall. Reforestation efforts would be monitored to record growth rates of young saplings over a 10-15 year period, to determine growth rates within sandy soil environments. Irrigation would be installed before saplings are planted, and would continue for approximately three years. A weeding and maintenance program would also be developed to ensure the establishment of the young saplings.



The Monterey cypress forest is north of the Presidio Trust's maintenance facility (Bldg. 1750). The facility is east of Lincoln Blvd. and north of Lobos Creek

Implementation Timeline 2001

- Planning completed
- Tree Removal - see text above
- Site preparation
- Reforestation

Historic Forest Character Study and Management Treatments

Under the VMP, four Key Historic Forest Stands are identified for preservation through intensive management

The Presidio Trust, in coordination with the National Park Service, is conducting a study to identify those character-defining features that contribute to the forest's historical significance. From this effort, which is being completed by the outside professional Landscape Historians, forest management treatments will be developed that preserve these important character-defining features while also addressing other forest management objectives.

The Historic Forest Character Study is currently underway. A workshop focusing on forest's landscape character was held on March 12, 2001. Additional analysis of character is currently underway in anticipation of a second workshop focusing on management treatments to be held later this year.

Public Walks Through Pilot Projects

Serpentine grasslands support a high diversity of plant species

Forest diversification with coast live oak and other trees, is currently being considered

Sat., July 21, 2001- 9:30 – 11:30 a.m.
Inspiration Point
Across from the Presidio Golf Clubhouse

Wed., Aug 1, 2001- 5:00 – 7:30 p.m.
Inspiration Point
Across from the Presidio Golf Clubhouse

Wed., Sept 19, 2001- 5:00 – 7:30 p.m.
Historic Forest Treatments to Increase Forest Health (Pruning, Thinning, Species Replacement)
Building 1750 (across the street from Baker Beach)

Please contact Katrina Strathmann, NPS Ecologist at (415) 561-4457 or Beatrice Ammann, Trust Planning Technician at (415) 561-5413 for any questions and to make reservations.